

Remarks

Applicants acknowledge and appreciate the Examiner's allowance of claims 11 and 12. No new matter is added by the amendments in the specification and the claims or by the addition of five new claims, all of which are supported by the original disclosure, as discussed below. See, MPEP § 2163.07. Consideration and allowance of all the claims, as amended, are requested.

Paragraphs [0010], [0032], and [0070] have been amended in the specification to correct three minor typographical errors, one in each of said paragraphs. Claims 4, 5, 15 and 16 were previously withdrawn from consideration by the Examiner pursuant to a restriction requirement. Applicants have amended claims 1-3, 8, 9, and 11-14, and have added new claims 17-21.

The § 102 Rejections

Claims 1, 8, 13 and 14 were rejected under § 102(b) as being anticipated by Alleaume, *et al.* (U.S. Pat. No. 5,132,055), with specific reference to Figures 4 and 5 of that reference.

Applicants have amended claims 1, 8, 13, and 14 by adding the following limitation:

without collecting a substantial portion of the liquid in a second flow of the liquid descending in the exchange column away from the inner wall.

The addition of this limitation clarifies claims 1, 8, 13 and 14 by making it clear that the wall-flow collector collects only liquid descending on or near the inner wall of the exchange column, and does not collect the other liquid descending in the exchange column. In contrast, the distributor 1 shown in Figures 1 and 4 of Alleaume, *et al.* collects substantially all of the liquid descending in column 22. Therefore, Applicants' claimed invention is structurally and functionally different than the distributor disclosed in Alleaume, *et al.*

This is also true of Figure 5 shown in Alleaume, *et al.* As discussed at column 4, line 56 to column 5, line 2, the embodiment of the distributor shown in Figure 5 collects "all" of the liquid which falls from the upper pack 26 into each of the spaces 20 which collect liquid across the entire area of the distributor 1. Collection of the liquid is not limited to the liquid descending on or near the inner wall of the exchange column, as in Applicants' claimed invention.

Since Applicants' invention includes at least one feature not disclosed by Alleaume, *et al.*, withdrawal of the rejection of claims 1, 8, 13 and 14 under § 102 is requested.

The § 103 Rejections

Claims 1-3, 6, 7, 13 and 14 were rejected under § 103(a) as being unpatentable over Meier, *et al.* (U.S. Pat. No. 4,427,605). In support of his position, the Examiner stated:

Mier *et al.* (Figs. 1 and 2) substantially disclose applicant's invention as recited by instant claims 1-3, 6, 7, 13 and 14, except for a specific recitation that the packing is spaced from the column wall and how the wall wiper (9) is attached to the column wall, i.e., fixed or movable. Wherein it is well known within the art that wall effect maldistribution of liquid within a column having structural packing is a common problem, it would have been obvious to an artisan at the time of the invention, to space the packing from the wall, to minimize short circuiting of the liquid along the wall of the column. Furthermore, it is also well known within the art to either fix or allow the wiper to float within the column, it would have been obvious to an artisan at the time of the invention, to chose either means for locating the wall wiper at the desired level within the column. Applicant should note Harper '150, which teaches sealing a wiper to the column wall without fixedly attaching it thereto.

Applicants respectfully disagree with the Examiner's position. The object identified by reference numeral 9 in Figure 1 of Meier, *et al.* is not a wall wiper, but rather a guide funnel which discharges liquid from an exchange section or zone 2a onto a tray device 4. The tray device shown in Figures 1 and 2 receives substantially all of the liquid discharged from the funnel across the cross section of the column. Due to a significant annular gap between the tray device and the column wall, as shown in Figure 1, the tray device does not collect liquid descending on or near an inner wall of the exchange column.

Therefore, Meier, *et al.* (Figs. 1 and 2) does not substantially disclose Applicants' invention as recited in original claims 1-3, 6, 7, 13 and 14, nor does it disclose Applicants' claimed invention as set forth in the amended claims. In view of the significant differences between Applicants' invention and Meier, *et al.*, Applicants' claimed invention (as described in the original claims and in the amended claims) would not have been obvious to a person skilled in the art.

Moreover, since independent claim 1 is not obvious under § 103 (for the reasons discussed above), claims 2, 3, 6, and 7 which depend from claim 1 also are non-obvious. *In re Fine*, 837 F.2d 1071, 1076, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988).

The Examiner also rejected dependent claims 6 and 7 under § 103 as being unpatentable over Alleaume, *et al.* taken together with Harper (U.S. Pat. No. 4,369,150). The Examiner took the position that it would have been obvious to an artisan at the time of the invention to combine the teachings of the prior art references to obtain Applicants' claimed invention.

However, as discussed above with regard to the § 102 rejection, the structure and function of Applicants' invention are significantly different from Alleaume, *et al.* Harper does not remedy the deficiencies of that reference with respect to the claimed invention. Even when combined, the references do not yield Applicants' claimed invention.

Moreover, since independent claim 1 is not obvious under § 103 (for the reasons previously discussed), claims 6 and 7 which depend from claim 1 also are non-obvious. *In re Fine, supra.*

The Examiner also rejected dependent claims 9 and 10 under § 103 as being unpatentable over Alleaume, *et al.* taken together with Harper, *et al.* (U.S. Pat. 4,432,913). The Examiner concluded that it would have been obvious to an artisan at the time of the invention to modify the channel structures of Alleaume, *et al.* in view of Harper, *et al.* '913 to obtain Applicants' claimed invention in claims 9 and 10.

However, as discussed above with regard to the § 102 rejection, Applicants' invention is significantly different from Alleaume, *et al.*, both structurally and functionally. Harper, *et al.* '913 does not remedy the deficiencies of Alleaume, *et al.* with respect to the claimed invention, as claimed in the original claims or in the amended claims set forth herein. Even when combined, those references do not yield Applicants' claimed invention.

Furthermore, since independent claim 8 (as originally submitted and as amended) is not obvious under § 103, claims 9 and 10 which depend from claim 8 also are non-obvious. *In re Fine, supra.*

In sum, Applicants' claimed invention is not obvious, since there are features in Applicants' amended and new claims that would not be obvious to one skilled in the art. Specifically, none of the references (nor any combination of the references) cited by the Examiner disclose an apparatus or method for collecting and redistributing the liquid in a first flow of a liquid descending on or near an inner wall of an exchange column without collecting a substantial portion of the liquid in a second flow of the liquid descending in the exchange column away from the inner wall.

For all of the foregoing reasons, withdrawal of all of the rejections under § 103 is requested.

Support for New and Amended Claims

Claims 1, 8, 13, and 14 have been amended to make it clear that the wall-flow collector collects only liquid descending on or near the inner wall of the exchange column, and does not collect the other liquid descending in the exchange column away from the inner wall. The language of the amendment states: "without collecting a substantial portion of the liquid in a second flow of the liquid descending in the exchange column away from the inner wall."

Support for this limitation appears at least at the following places in the original application. Paragraph [0071] on page 15 states in relevant part at lines 20-21: "Redistributors of the present invention do not collect the entire liquid flow" Paragraph [0090], which discusses some of the benefits and advantages of the redistributors of the present invention, states in relevant part at lines 32-33 on page 19 that one of the advantages "is the result of having to handle only the liquid at the column periphery, not the full liquid flow." Also, the drawings of the embodiments of the invention shown in Figures 1A, 5A, and 6A clearly illustrate that the redistributor is not designed to collect the entire liquid flow descending in the column, but rather only the liquid at the column periphery.

Claims 1, 3, 8, 13, and 14 were also amended for further clarification to refer to "first" and "second" flows of the liquid descending in the exchange column. As indicated in the amended claims, the first flow of the liquid refers to the liquid descending on or near the inner wall, and the second flow of the liquid refers to the rest of the liquid descending in the exchange column away from the inner wall. These clarifying amendments are supported by the same parts of the specification and the drawings referred to in the above paragraph in support of the previously discussed amendment.

Although the language of the amendments is not identical to that of the specification, persons skilled in the art would understand the language of the amendments when read together with the specification in view of the drawings. It is not necessary that the application describe the claim limitations exactly. Application of *Wertheim*, 541 F.2d 257, 262, 191 USPQ 90, 96 (CCPA 1976), citing *In re Lukach*, 442 F.2d 1967, 169 USPQ 795 (CCPA 1971).

The preambles of claims 1, 8 and 14 were amended to make clear that the claimed apparatus and method are for collecting and redistributing a flow of a liquid descending "on or near an inner wall" of the exchange column. Since that phrase previously appeared in the body of each of original claims 1, 8 and 14, the inclusion of the phrase in the preambles of those claims for clarification is appropriate and fully supported. Further, support for that limitation also appears in the Abstract; claims 11, 12, 13, and 16; and paragraphs [0028], [0039], [0043], [0048], [0070], [0071], [0073], [0088], and [0090].

Claims 1, 9, 13 and 14 were amended to clarify that the plurality of apertures or other dispensing means are "at a plurality of locations spaced apart over the substantial distance across the cross-sectional area of the exchange column." This limitation is supported at least by Figures 1A, 5A, 6A, and 7A, which show holes 16 (the dispensing means in the illustrated embodiments) spaced apart from each other and spread over a substantial distance from the inner wall of the exchange column across the cross-sectional area of the exchange column.

Claim 9 was further amended by changing "at least one aperture" to "a plurality of apertures," and claim 2 was further amended by changing "at least one aperture or overflow notch" to "a plurality of apertures or overflow notches."¹ Support for these amendments appears in: Figures 1A, 1B, 5A, 6A, and 7A; paragraphs [0006], [0073] and [0085]; and claims 2, 9, 11 and 12.

Claims 1, 8, 13, and 14 were amended by deleting the phrase "toward the longitudinal axis" and inserting instead the phrase "away from the inner perimeter of the inner wall" with reference to

¹ Claim 2 was also amended by correcting a typographical error whereby "trough" was misspelled as "through." A person skilled in the art having read the specification and reviewed the drawings would have understood that "trough" was intended instead of "through," especially since the word "trough" was used in several other places in claim 2, including as an antecedent basis for the term "trough."

the direction of transmission of the liquid from the wall-flow collector across the cross-sectional area of the exchange column. As originally written, the phrase “toward the longitudinal axis” was too limiting in view of the embodiments of the invention shown in Figure 1A and Figure 5A. (Persons skilled in the art will recognize that other embodiments of the invention also could involve transmission of the liquid across the cross-sectional area of the exchange column in directions other than “toward the longitudinal axis.”)

The liquid is in fact transmitted “toward the longitudinal axis” in embodiments such as those shown in Figure 6A and Figure 7A, as well as in the particular trough positioned directly across the diameter of each column shown in Figure 1A and Figure 5A. In those cases, the broader phrase “away from the inner perimeter of the inner wall” covers or includes transmission of the liquid “toward the longitudinal axis.” However, the former broader phrase also covers the transmission of the liquid across the cross-sectional area of the exchange column in directions other than directly toward the longitudinal axis, such as in the cases of the other troughs which are not on the diameter of the exchange columns in the embodiments shown in Figure 1A and Figure 5A.

There is ample support for the broader limitation “away from the inner perimeter of the inner wall” throughout the original application and drawings. As discussed above, Figure 1A and Figure 5A provide support for this limitation. Further support appears in paragraph [0073] on page 16, lines 3-4: “The liquid collected at the wall of the column... is transported across the column cross-section... .” This language, which refers to the embodiment shown in Figure 1A, does not limit transportation of liquid across the column cross-section to “toward the longitudinal axis.”

Additional support for the broader limitation is found in the original application at paragraphs [0070], [0071], [0088], and [0090]. The pertinent phrases in paragraphs [0088] and [0090] state that the liquid captured at the wall is conveyed or redistributed “into the interior of the structured packing” and “into the interior of the packing, away from the column wall.”

The phrase “toward the longitudinal axis,” which appears throughout the application actually is a subset of the broader limitation “away from the inner perimeter of the inner wall” in the amended claims. As such, all references to the phrase “toward the longitudinal axis” in the application also provide further support for the amendment. See Figures 6A and 7A; paragraphs [0028], [0039], [0043], [0045] to [0048], and [0050]; original claims 1, 8, 11-14, and 16; and the Abstract.

Claims 1 and 8 were amended to make clear that the collected liquid is redistributed to a layer (or a first layer) of structured packing disposed in the exchange column. Support for this amendment appears in paragraphs [0048], [0049] and [0073], as well as in original claims 14 and 15.

Claim 8 was also amended to make clear that the wall-flow collector has an outer perimeter adjacent the inner perimeter of the inner wall. Similar language appeared in original claims 1, 13, 14, and 16. Support for that language and the present amendment of claim 8 appears in the Abstract and Figures 4C, 5A, 6A and 7A.

Claims 3 and 8 were also amended to refer to the "inner perimeter of the" inner wall. Similar language appeared in original claims 1, 8, 11-14 and 16. Support for that language and the addition of it to claim 3 and again to claim 8 also appears in the Abstract; paragraphs [0039], [0043], [0045] to [0048], and [0050]; and Figures 3A, 3B, 3C, 4A, 4B, 4C, 5A, 6A, 7A, 7B, and 9A.

Claim 13 was amended to make clear that the vapor in the exchange column is "ascending." Similar language appeared in original claim 15, and further support for this amendment is found in paragraphs [0002], [0007], and [0080].

New claim 17 is similar to allowed original claim 11, but differs in several substantial ways, including but not limited to the two ways discussed herein. First, the apparatus in new claim 17 does not include the wiper element of the apparatus in claim 11. Second, claim 17 is broader in that the channel in the apparatus of claim 17 is adapted to transmit the collected fluid "away from the inner perimeter of the inner wall," not more narrowly "toward the longitudinal axis," as in claim 11. (See Figure 1A and Figure 5A.) Support for new claim 17 appears throughout the original application and drawings, including but not limited to the following: Figures 1A, 4C, 5A, 6A, and 7A; the Abstract; original claims 1, 11, and 13-16; and paragraphs [0045], [0049], [0071], [0073], and [0090].

New claim 19 is similar to allowed original claim 12, but differs in several substantial ways, including but not limited to the two ways discussed herein. First, the apparatus in new claim 19 does not include the wiper element of the apparatus in claim 12. Second, claim 19 is broader in that the channel in the apparatus of claim 19 is adapted to transmit the collected fluid "away from the inner

perimeter of the inner wall," not more narrowly "toward the longitudinal axis," as in claim 12. (See Figure 1A and Figure 5A.) Support for new claim 19 appears throughout the original application and drawings, including but not limited to the following: Figures 1A, 4C, 5A, 6A, and 7A; the Abstract; original claims 1, 12, and 13-16; and paragraphs [0046], [0049], [0071], [0073], and [0090].

New claims 18 and 20 are dependent claims depending from new claims 17 and 19, respectively. These new dependent claims add the element of a wiper to the apparatus claimed in new independent claims 17 and 19. Support for these new dependent claims appears in the original application at paragraphs [0042], [0045], and [0046]. Additional support appears in original claims 3, 11, and 12.

Finally, new dependent claim 21 depends from amended independent claim 1. Claim 21 specifies that a plurality of the plurality of locations of the dispensing means are located a substantial distance from the inner perimeter of the inner wall. Support for new claim 21 appears in the drawings, specifically Figures 1A, 5A, 6A and 7A.

Allowable Subject Matter

The Examiner stated that claims 11 and 12 were allowed as originally submitted. However, Applicants have amended both claims 11 and 12 solely for the purpose of clarification. Since claims 11 and 12 refer to "first" and "second" layers of structured packing, those claims have been amended to make it clear that the layer of structured packing receiving the dispensed collected liquid from the channel of the beam is the first layer.

Since the clarifying amendments in previously allowed claims 11 and 12 do not broaden those claims and more clearly define Applicants' claimed invention, Applicants request that the Examiner allow claims 11 and 12, as amended.

Supplemental IDS

On January 19, 2005, Applicants' attorney submitted a Supplemental Information Disclosure Statement (IDS) disclosing six U.S. patent documents and two foreign patent documents which were identified in a European Search Report mailed November 29, 2004. Applicants request that the Examiner indicate that those documents identified in the Supplemental IDS have been considered by the Examiner and made of record with respect to this application. Applicants submit that all the

amended claims and the new claims set forth in the listing of claims herein are patentable over all of the references in the Supplemental IDS, as well as all of the other art of record.

Conclusion

For all of the foregoing reasons, Applicants submit that the claims, as amended, are patentable over the art of record. Withdrawal of the rejections and an early Notice of Allowance are earnestly solicited.

Respectfully submitted,



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